Space Weather Forecast

Issued on Saturday, 30 October 2021 at 13:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Large CME expected to arrive at Earth later on 30th persisting into the 31st. Minor to Moderate geomagnetic storms expected, with a likelihood of occasional moderate storms. Chance of Aurora sightings for Northern UK. Chance of further moderate flares from sunspots.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low, with three common-class flares detected. There are currently four sunspot regions visible, although one is now moving out of view over the sun's western horizon. No Earth-directed coronal mass ejections (CMEs) were seen.

Solar Wind / Geomagnetic Activity: The solar wind speed was at slow levels between 280 and 340 km/s. Its magnetic field was weak, with no significant negative deflections in the important north-south direction. Resultant geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at Minor storm level throughout, as a result of the strong flare that occurred on the 28th.

Four-Day Space Weather Forecast Summary

Solar Activity: Low solar activity is forecast with a chance of moderate-class flares, these most likely from the either of the large sunspot regions visible, one in the in the sun's southwest quadrant, and one in the northeast.

Solar Wind / Geomagnetic Activity: A large CME from the strong flare on the 28th is forecast to arrive at Earth during the second half of day 1 (30th), most likely around 1600 UTC. Geomagnetic activity is expected to be quiet to start, but during the CME transit, minor to moderate geomagnetic storms are expected, with a likelihood of isolated Strong storms. Geomagnetic activity is then expected to gradually subside during the latter part of day 2 into day 3 (31st and 1st) with an eventual return to mainly Unsettled levels, and a chance of Active intervals. A further strengthening of the solar wind is then possible at the end of day 4, with a chance of Minor geomagnetic Storms. Aurora is likely to be visible for some northern parts of the UK, given clear skies.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) will continue declining from their current Minor storm levels, likely falling below the threshold by early day 2 (31st). There is an ongoing risk of further slight rises should any notable flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	90	80	40	30
Strong	**G3**	No	60	60	5	1
Severe	**G4**	No	10	10	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 M Class**	No	40	40	40	40
Very Active	**R3 to R5 X**	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	100	60	10	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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